

# CASE STUDY

## FLUID CODES

 SOFTWARE    SUPPORT    TRAINING    CUSTOMIZATION

### CONTACT OUR LOCAL OFFICES

UNITED ARAB EMIRATES +971 4330 8666  
SAUDI ARABIA +966 13 8318182  
EGYPT +971 4330 8666  
BULGARIA +359 88 8813820  
UNITED KINGDOM +44 20 3753 4607

 [sales@fluidcodes.com](mailto:sales@fluidcodes.com)  
 [consulting@fluidcodes.com](mailto:consulting@fluidcodes.com)  
 [fluidcodes.com](http://fluidcodes.com)

### CFD ANALYSIS FOR ASHGHAL TUNNEL CASE

#### CHALLENGES

Fluid Codes carried out the study of a truck fire and smoke dispersion, in a total of three road tunnels located in Doha, Qatar.

The design of a ventilation system for tunnels (Induction fans) which should inject fresh air along the tunnel with a certain velocity (critical velocity) is an important task for effective management of fire events.

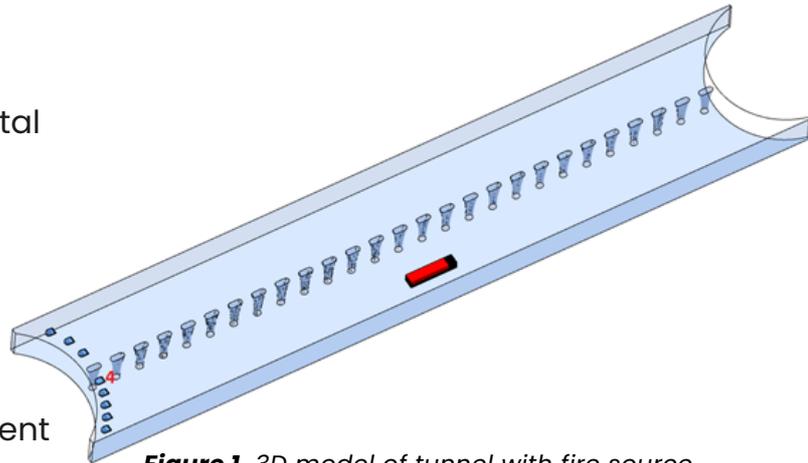


Figure 1. 3D model of tunnel with fire source

#### Engineering Solution

The critical velocity would lead and control two main phenomena: first was the occurrence of the back layering flow upstream of the fire. Second was the size of the zone with less diluted smoke (visibility not less than 10 meters) downstream of the fire. However, velocity lower or higher than the critical velocity would directly change the size zone of those phenomena.

The time dependent visibility contour and temperature plots helped investigate the smoke plume accumulated at human height and, thus, determine compliance with NFPA code for evacuation.

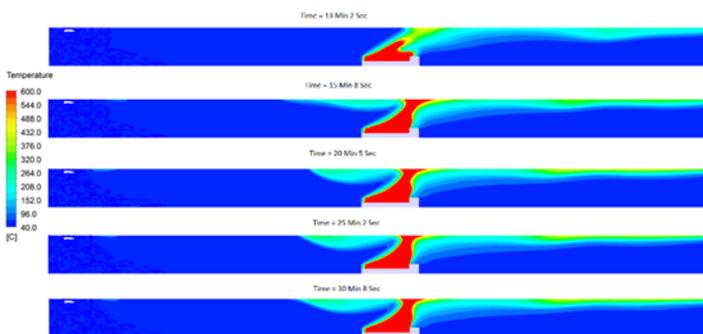


Figure 2. Temperature contour

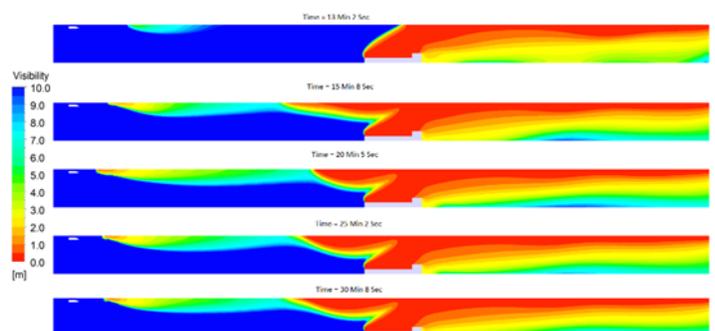


Figure 3. Visibility contour